Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Reply on: COVID-19 associated pediatric vasculitis: A systematic review and detailed analysis of the pathogenesis

We appreciate the letter from Bryant et al. regarding our recent study "COVID-19 associated pediatric vasculitis: A systematic review and detailed analysis of the pathogenesis'' [1]. In this systematic review, we focused on the possibility of COVID-19 and pediatric vasculitis association, and aimed to raise awareness among physicians to enable early diagnosis and effective, timely management in these patients.

Bryant et al. drew attention to the difficulty of diagnosing children with anti-neutrophil cytoplasmic antibody (ANCA)-associated vasculitis (AAV). Our review included five children with (possibly) COVID-19-associated AAV [2–6]. Currently, there are six pediatric patients in the literature, including the patient presented by Bryant et al. [7]. In one of these patients, the initial diagnosis was immunoglobulin A vasculitis/Henoch Schönlein purpura (IgAV/HSP) [5]. Indeed, there are pediatric patients in the pre-pandemic literature who were previously misdiagnosed with IgAV/HSP but subsequently diagnosed as having AAV [8,9]. The overlap between IgAV/HSP and granulomatous polyangiitis (GPA) regarding skin vasculitis, musculoskeletal involvement, and initial renal manifestations are probably the main factors leading to misdiagnosis, considering the much higher prevalence of IgAV/HSP during childhood compared to GPA. However, these reports alert physicians about the possibility of AAV in patients presenting with features suggesting IgAV/HSP.

Recent data suggest that SARS-CoV-2 can trigger autoimmunity. AAV has been reported in adults after not only COVID-19 but also SARS-CoV-2 vaccines [10]. Children with COVID-19 associated AAV can present with a variety of signs and symptoms (Table 1). In the report of Bryant et al. [7], their patient presented with prolonged cough and wheezing in the post-COVID period. The disease escalated with additional symptoms suggesting the upper airway and middle ear involvement. The onset of symptoms at the early post-COVID period, the dominance of middle ear manifestations, and the absence of renal involvement made the GPA diagnosis challenging. Five out of six patients with COVID-19 associated AAV presented with symptoms suggesting a respiratory tract infection. The only exception is the patient presented with IgAV/HSP-like purpuric rash [5]. Awareness of these presenting features and the possibility of COVID-19 association will secure an early diagnosis in children with COVID-19 associated AAV.

Table 1
The presenting features of children with COVID-19 associated ANCA-associated vasculitis in the literature.

First author, year (ref. no.)	Sex	Age, years	ANCA subtype	Features at presentation
Powell, 2021 (2)	F	12	p-ANCA	Cough with blood-streaked sputum
Reiff, 2021 (3)	M	17	c-ANCA	Fever, cough, congestion, and shortness of breath
Raeeskarami, 2021 (4)	F	14	c-ANCA	Symptoms of respiratory tract infection
Wintler, 2021 (5)	F	13	c-ANCA	Swollen hands and feet, and purpura on the lower extremities and back
Fireizen, 2021 (6)	M	17	c-ANCA	Cough, respiratory insufficiency
Bryant, 2022 (7)	F	16	c-ANCA	Cough, wheezing, sinus congestion and pain, purulent nasal discharge, ear drainage

F, female; c-ANCA, cytoplasmic-anti neutrophil cytoplasmic antibody; M, male; p-ANCA, perinuclear-anti neutrophil cytoplasmic antibody.

Declaration of Competing Interest

The other authors have indicated they have no potential conflicts of interest to disclose.

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